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ENTOMOLOGY.—*New ichneumon-flies parasitic on the hemlock sawfly* (*Neodiprion tsugae* Middleton).<sup>1</sup> R. A. CUSHMAN, U. S. Bureau of Entomology and Plant Quarantine. (Communicated by C. F. W. MUESEBECK.)

Recent outbreaks of conifer-feeding sawflies of the genera *Diprion* and *Neodiprion*, both introduced and native species, have greatly increased the interest in and economic significance of the parasites of such insects. This has resulted in the rearing of large numbers of the parasites, many representing undescribed species, for which names are desired for use in economic and biological papers.

This paper consists of the descriptions of eight new species parasitic on the hemlock sawfly, *Neodiprion tsugae* Middleton, together with a few taxonomic and nomenclatorial notes pertinent to the main subject.

Genus **Ischnus** Gravenhorst

*Ischnus* Gravenhorst, *Ichneumonologica Europaea* 1: 638. 1829.—Viereck, U. S. Nat. Mus. Bull. 83: 78. 1914.

*Habrocryptus* Thomson, *Opuscula entomologica*, fasc. 5: 471, 498. 1873.—Schmiedeknecht, *Opuscula ichneumonologica*, fasc. 7: 502. 1904.

This is the *Ischnus* of the genotype, *porrectorius* (F.), not the phaeogenine genus *Ischnus* of European works. To it should be referred the following North American species:

<sup>1</sup> Received May 20, 1939.

**Ischnus amblytelarius** (Provancher), n. comb.

*Cryptus amblytelarius* Provancher, Additions et corrections au volume II de la faune entomologique du Canada . . . p. 70. 1886.

**Ischnus atricollaris** (Walsh), n. comb.

*Cryptus atricollaris* Walsh, Trans. St. Louis Acad. Sci. 3: 72. 1873.

**Ischnus polychrosidis** (Cushman), n. comb.

*Spilocryptus polychrosidis* Cushman, Proc. U. S. Nat. Mus. 53: 461. 1917.

**Ischnus oregonensis**, n. sp.

From the foregoing three species this species is easily distinguished by its entirely impunctate abdomen and distinctly convex (in front view) cheeks. Also the thorax never has any ferruginous color, although the propodeum is rarely partly piceous.

*Female*.—Length 6–8 mm (holotype 8 mm).

Head mat; temples strongly receding, convex; frons with a narrow, shining, median groove, scrobes also shining; eyes slightly divergent below antennae; clypeus strongly convex, small, shining; cheeks in front view convex; malar space as long as basal width of mandible; antenna distinctly shorter than body, 31-jointed, slender, filiform, first joint of flagellum nearly 6 times as long as thick, second only slightly shorter.

Thorax mat; pronotum mostly striato-rugulose; mesoscutum, scutellum, and pleura minutely punctate, the scutum and pleura confluent so, speculum polished; propodeum finely rugulose, dorsal face short, posterior face nearly vertical, transverse carinae distinct, apical carina sometimes obsolete medially but strong at angles; sides of areolet distinctly convergent toward radius, but their upper ends rather widely separated.

Abdomen granularly mat, impunctate, only the petiole dorsally shining; sheath of ovipositor about a half longer than first segment.

Black, with abdomen and legs ferruginous, front coxa and sometimes others more or less piceous, hind tibia (except base) and tarsus fuscous; anterior orbit and short streaks behind and above eye and a triangular spot in malar space whitish; labrum whitish; clypeus and mandibles piceous; palpi and flagellum fuscous; collar and usually a narrow humeral margin of pronotum whitish; tegulae brown; propodeum sometimes more or less reddish posteriorly (in holotype there is a streak of this color along median portion of apical carina); wings subhyaline, venation black.

*Male*.—Length 6–7 mm.

Much slenderer than female, with propodeum more evenly rounded and less precipitous and with weak carinae; genital sheath abruptly very slender apically. Head and thorax copiously white-marked, this color including face, clypeus, mandibles, palpi, malar space, broad orbital ring (interrupted only behind top of eye), underside of scape, ventral portion of propleuron, broad collar and humeral margin of pronotum, median spot on mesoscutum, scutellum, tegula, subalar tubercle, spots on lower mesopleuron, meta-pleuron and center of propodeum, front and middle coxae and trochanters, and a spot dorsally on hind coxa; hind coxa and basal joint of trochanter piceous; wings hyaline; petiole and apex of abdomen black.

*Host*.—*Neodiprion tsugae* Middleton.

*Type locality*.—Sweet Home, Oreg.

*Holotype*, *allotype*, and *paratypes*.—U.S.N.M. no. 53343.

*Paratypes*.—Canadian National Collection; California Academy of Sciences.

Thirteen females and 18 males (including holotype female and allotype male, a mated pair), all reared at the type locality from *Neodiprion tsugae* under N. E. For. Ins. Lab. no. 51.201, during June and October; 2 ♀ and 5 ♂ reared from type host at type locality under Hopk. U. S. nos. 31607-S, 31660-F, and 18875-F, during May, August, and September; 1 ♀ and 1 ♂, West Yellowstone, Mont., from sawfly on lodge-pole pine, Hopk. U. S. nos. 18088-F, Aug. 13, 1926 (♀), 18088-E, 1925 (♂); and 1 ♂, West Yellowstone, Mont., Hopk. U. S. no. 17243-B, April 9, 1925.

### *Spilocryptus neodiprionis*, n. sp.

From *Spilocryptus lophyri* (Norton), which is also parasitic on species of the genus *Neodiprion*, this species can be distinguished at once, in the female, by the entire lack of yellow markings on the head and thorax, and in the male by the black face and orbits, only the clypeus and mandibles being white, whereas in *lophyri* the orbits, and in the male, usually the middle of the face, are white-marked.

*Female*.—Length 5.5–8 mm (holotype 8 mm).

Head mat, face densely and postvertex more sparsely punctate, frons medially rugulose, lower cheeks polished; temples very strongly receding, weakly convex; clypeus strongly convex, shining; malar space about as long as basal width of mandible; antenna three-fourths as long as body, 26- to 27-jointed, slender, filiform, first joint of flagellum six times as long as thick at apex, subapical joints definitely longer than thick.

Thorax dorsally shining, mesothorax densely and finely punctate and scutellum sparsely so; pronotum mostly striate; mesopleuron and metapleuron finely rugulose, mat; sternum shining, finely punctate; propodeum more coarsely rugulose than pleura; apical carina rather prominent laterally, broadly interrupted medially; sides of areolet slightly convergent, recurrent at or slightly beyond middle of areolet.

Abdomen very minutely coriaceous, with minute scattered punctures on basal tergites and with rather dense and very fine appressed silvery pubescence; first tergite impunctate and glabrous dorsally, the petiole polished; sheath of ovipositor barely longer than first segment.

Black, with basal three abdominal segments and legs ferruginous; a median spot on tergite 7 and usually an incomplete annulus centering on flagellar joints 7–8 white; antenna reddish fuscous, scape redder; tegulae piceous; hind femur apically and tibia dorsally blackish; wings subhyaline, venation black.

*Male*.—Length 5.5–7 mm.

More slender than female and with propodeum more evenly rounded because of much weaker apical carina; clypeus, mandibles, palpi, and tegulae whitish; antenna without trace of annulus; legs paler, especially front and middle coxae and trochanters and joints 2–4 of hind tarsus, the tarsus otherwise darker than in female; tergites 4 and 5 also ferruginous, some or all of the red tergites frequently more or less spotted or banded at base with black; tergite 7 without white spot.

*Host*.—*Neodiprion tsugae* Middleton.

*Type locality*.—Sweet Home, Oreg.

*Holotype, allotype, and paratypes*.—U.S.N.M. no. 53344.

*Paratypes*.—Canadian National Collection; California Academy of Sciences.

Described from 27 females and 29 males all reared from the host in April, May, June, and October 1936, under N. E. For. Ins. Lab. no. 51.201. Included are five mated pairs, identified by the added number 36.2, of which the holotype female and allotype male are one pair.

Unlike most species of the genus, this lacks the conspicuous white annulus at the base of the hind tibia.

#### *Aptesis (Pezoporus) tsugae*, n. sp.

Unusual in the form of the areolet, which is nearly parallel-sided.

*Female*.—Length 5–8.5 mm (holotype 8.5 mm).

Head narrower than thorax, finely coriaceous, somewhat shining; temples convex, receding; vertex and frons medially grooved; scrobes shallow, subpolished; eyes divergent below, antennae not far above inferior tangent of eyes; face with a small, round, median elevation; clypeus small, strongly convex, apically truncate; malar space as long as basal width of mandible; antenna about two-thirds as long as body, stout filiform, 25- to 27-jointed, first joint of flagellum slightly shorter than second and about two and a half times as long as thick.

Thorax stout; pronotum mat, finely striato-coriaceous; mesoscutum shining and faintly punctate laterally, densely and finely punctate medially, notaulices fine and distinct anteriorly; scutellum polished, sparsely punctate; mesopleuron shining, indefinitely coriaceous and sparsely and weakly punctate, fovea very deep; sternum shining and sparsely punctate; metapleuron mat, finely coriaceous; propodeum short dorsally, precipitous and concave posteriorly, basal area and areola confluent, basal carina obsolete, apical strong, basal lateral and petiolar areas coriaceous, surface elsewhere rugulose; legs moderately stout; areolet nearly parallel-sided, second intercubitus mostly bullate, second recurrent slightly before middle of areolet; nervulus slightly postfurcal, postnervulus broken nearly at middle; nervellus broken near bottom and strongly inclivous.

Abdomen broad, coriaceous, mat; sheath of ovipositor about as long as first segment.

Black; inner orbits, a more or less definite incomplete annulus on flagellar joints 7–9, tegulae, wing radices, and a more or less distinct line on humeral margin of pronotum white or whitish; face medially, and clypeus and mandibles more or less, reddish; antenna apically and ventrally reddish; thorax black, sometimes piceous or ferruginous laterally and ventrally; legs ferruginous; wings hyaline, venation blackish; abdomen normally black, with reddish tinge, especially at apices of tergites, but frequently more definitely reddish especially on tergites 1–3.

*Male*.—Length 5.5–7 mm (allotype 6.5 mm).

Much more slender than female, with antenna tapering and nearly as long as body, joint 1 of flagellum distinctly longer than 2 and three times as long as thick; malar space much shorter than basal width of mandible; eyes parallel; antenna not far below middle of eye; propodeum longer above and shorter behind, with petiolar area more sloping and more weakly concave.

Color as in female, but with less tendency to red on thorax and abdomen; antennae entirely black; white markings more extensive, including face, clypeus, mandibles, palpi, and front and middle coxae and trochanters; hind coxa and trochanter piceous, apically whitish; hind tibia apically and tarsus blackish.

*Host.*—*Neodiprion tsugae* Middleton.

*Type locality.*—Sweet Home, Oreg.

*Holotype, allotype, and paratypes.*—U.S.N.M. no. 53345.

*Paratypes.*—Canadian National Collection; California Academy of Sciences.

Thirty-six females and 33 males, all from the type locality and all reared from *Neodiprion tsugae*, 30 females and 31 males under N. E. For. Ins. Lab. no. 51.201. Included in this series are five mated pairs, of which the holotype female and allotype male are one pair. The other 6 females and 2 males were reared under Hopk. U. S. nos. 31607–204, 31660-V, 31660-Q, and 31675-V.

#### Genus *Thysiotorus* Foerster

In his *Type species of the genera of ichneumon flies*<sup>2</sup> Viereck designated, as the type of *Thysiotorus* Foerster, *Hemiteles (Physiotorus) brevipennis* Brischke, assuming Brischke's spelling of the subgeneric name to be a typographical error.

The genus was originally characterized only by the few characters leading to it in Foerster's key to his family Phygadeuontoidae, and no species was assigned to it. The first couplet in the key definitely excludes Brischke's two species from *Thysiotorus*, for they are described as having the wings short, and quite obviously would run not to *Thysiotorus* but to *Phyrtus*, and one wonders if the name *Physiotorus* was not a lapsus for *Phyrtus* on the part of Brischke rather than a printer's error in the spelling of *Thysiotorus*. In any event, it is obvious that neither of the two species referred to *Physiotorus* by Brischke can properly serve as genotype of *Thysiotorus*.

The next inclusion of a species in *Thysiotorus* was by Viereck,<sup>3</sup> who referred *Mesoleptus? peregrinus* Cresson to the genus. I have already shown<sup>4</sup> that this species can not be accepted as the genotype, since it disagrees with the original description of the genus.

In Foerster's key *Thysiotorus* is grouped with *Panargyrops* and *Apsilops* (as though their author considered them related) on three characters: Long, slender, basal joints of flagellum, silky-haired face, and long deep notaulices. By these same three characters with others, Thomson characterized his genus *Leptocryptus*,<sup>5</sup> including in it *claviger* Taschenberg, properly designated by Viereck as genotype of *Panargyrops* and of the synonymous

<sup>2</sup> U. S. Nat. Mus. Bull. 83: 145. 1914.

<sup>3</sup> Proc. U. S. Nat. Mus. 42: 645. 1912.

<sup>4</sup> *Ibid.* 58: 258, 260. 1920.

<sup>5</sup> Opuscula entomologica, fasc. 10: 963–966. 1884.

*Leptocryptus*. Also included in *Leptocryptus* is *L. lamina* Thomson, which agrees perfectly with the published description and also with Foerster's detailed unpublished description of *Thysiotorus*. I have already<sup>4</sup> referred *lamina* Thomson and *smithi* Cushman doubtfully and *Mesoleptus triangularis* Cresson positively<sup>6</sup> to *Thysiotorus*, and I am now convinced that they are properly to be referred to the genus. Viereck<sup>7</sup> apparently had no such doubt with regard to *smithi*, for he definitely referred it to *Thysiotorus*, thereby making it the first species properly so referred.

The following alterations to Viereck's genotype catalogue are therefore proposed:

*Thysiotorus* Brischke (not *Thysiotorus* Foerster).

Schrift. Naturf. Ges. Danzig 7 (N.F.): 71. 1891. Two species.

Type.—*Hemiteles* (*Physiotorus*) *brevipennis* Brischke (by designation of Viereck, U. S. Nat. Mus. Bull. 83: 116. 1914).

*Thysiotorus* (Foerster) Viereck.

Verh. Naturh. Ver. Preuss. Rheinlande 25: 81. 1868. No species.

Can. Ent. 57: 77. 1925. One species.

Type.—(*Thysiotorus* ? *smithi* Cushman) = (*Mesoleptus*) *Thysiotorus triangularis* (Cresson), new synonymy. By present designation; *Hemiteles* (*Physiotorus*) *brevipennis* Brischke (by designation of Viereck, U. S. Nat. Mus. Bull. 83: 145. 1914) does not agree with original description and is therefore not available as genotype.

The above entries should replace the earlier emendations to the type catalogue proposed by me<sup>4</sup> under the headings "*Thysiotorus* Brischke, not Foerster" and "*Thysiotorus* Foerster."

The following is a free translation of Foerster's manuscript description:

#### THYSIOTORUS Foerster

Clypeus weakly separated from face, flat, rounded at apex and transversely impressed, without apical denticles, but slightly projecting medially; face and clypeus covered with long silky hair; clypeal foveae and malar space with much denser hairs, these hairs curved—not long, straight, and weak as those on the face and clypeus; teeth of mandible of equal length; first joint of flagellum longer than second; mesoscutum with notaulices deep and complete; propodeum with long hair, completely areolated; first abdominal segment slender, little broadened toward apex, fringed laterally by long erect hair, spiracles slightly behind middle; second segment with thyridia far from base, spiracles behind middle; nervellus not broken; second discoidal cell a little or distinctly broader at base than the brachial cell at apex; discocubitus broken; hind calcaria less than one-third as long as basitarsus; fifth tarsal joint somewhat shorter than third.

Following the description in Foerster's manuscript is a key to nine manuscript species.

#### *Thysiotorus latifrons*, n. sp.

Similar to *triangularis* (Cresson), but with smaller eyes, broader face, longer malar space, more shining propodeum, and open areolet.

<sup>6</sup> Proc. U. S. Nat. Mus. 74 (16): 58. 1927.

<sup>7</sup> Can. Ent. 57: 77. 1925.

*Female*.—Length 5.5 mm, antenna 4 mm.

Head with dense silvery pubescence, longest on face and sides of frons; combined face and clypeus as broad as long; eyes very slightly convergent; clypeus convex, transversely impressed before the bidenticulate apex, foveae covered by tufts of long curved hairs; malar space two-thirds as long as basal width of mandible; temple convex, strongly receding, two-thirds as long (in dorsal view) as short diameter of eye; diameter of lateral ocellus longer than postocellar line and nearly as long as ocellocular line; antenna 26-jointed.

Thorax shining, with long silvery pubescence; pronotum laterally largely polished and glabrous, as is also a large area on mesopleuron embracing speculum and a deep, oblique impression; propodeum shining, especially medially, where it is virtually hairless, apical carina nearly at middle of dorsal length, areola large with costulae far before middle; areolet open at apex, the second intercubitus barely indicated.

Abdomen elongate fusiform, widest at apex of third segment; first tergite scarcely twice as broad at apex as at base, spiracles barely behind middle, postpetiole laterally striate; tergites 2 and 3 longitudinally striate, polished apically, polished areas longer medially; other tergites, except finely punctate base of 4, unsculptured; ovipositor sheath about as long as first segment.

Black; mandibles reddish; palpi, scape below, front and middle legs, tegulae, and small humeral angles of pronotum stramineous to whitish; tergites pale reddish stramineous apically, 2 to 4 triangularly so; front tarsus apically and middle tarsus except base black; hind coxa, trochanter, and femur brownish ferruginous to piceous, coxa and trochanter stramineous below; hind tibia fuscous, paler below; tarsus black, calcaria pale; wings hyaline, venation blackish, stigma pale at base.

*Male*.—More slender than female but otherwise very similar structurally; hind coxa and trochanter stramineous, hind femur somewhat paler; pale markings of abdomen larger, those of tergites 2-4 sometimes extending to base medially.

*Host*.—*Neodiprion tsugae* Middleton (probably secondary).

*Type locality*.—Sweet Home, Oreg.

*Holotype*, *allotype*, and *paratypes*.—U.S.N.M. no. 53346.

*Paratypes*.—Canadian National Collection; California Academy of Sciences.

Described from 50 females (including holotype) and 16 males (including allotype), all reared from cocoons of *Neodiprion tsugae* Middleton, undoubtedly as secondary parasites, partly at the type locality by R. L. Furniss, under Hopk. U. S. no. 31600G, and partly at the Northeastern Forest Insect Laboratory, New Haven, Conn., under no. 51-201-35, from cocoons of *N. tsugae* received from Sweet Home, Oreg.

#### ***Panargyrops areolaris*, n. sp.**

Closely related to *tibialis* Cushman, but generally stouter, with postpetiole nearly or quite twice as broad as petiole and second tergite much less than three times as long as basal width; clypeus nearly or quite as long as face is medially; propodeal areola very large, broader than long, with sides parallel; and ovipositor distinctly less than three-fourths as long as abdomen.

*Female*.—Length 6–8 mm (holotype 8 mm).

Head thick, occiput shallowly concave; temples hardly receding; diameter of lateral ocellus as long as postocellar line and half as long as ocellular line; eyes parallel; face twice as broad as long, hardly longer medially than clypeus; malar space more than half as long as basal width of mandible; clypeal denticles distinct and rather widely separated; eyes somewhat bulging; antenna as long as abdomen, 29-jointed in holotype.

Thorax rather stout, much less than twice as long as deep, polished, very faintly punctate; pronotum not striate below, epomia distinct nearly to ventral angle; mesoscutum nearly circular, as broad as long; propodeal areola very large, slightly broader than long.

Abdomen slender, minutely punctate; postpetiole nearly twice as broad at apex as petiole, medially channeled; second tergite less than three times as long as basal width, third about as long as broad; ovipositor sheath little more than half as long as abdomen.

Black; pubescence with silvery reflection; scape below, mandibles, palpi, tegulae, and radices of wings white; humeral angle of pronotum pale reddish; legs reddish testaceous to ferruginous, hind leg darkest, front coxa and front and middle trochanters whitish, hind tibia mostly fuscous, its tarsus black, calcaria pale; abdomen with apical tergites very narrowly pale margined, venter whitish with piceous sternites.

*Male*.—Differs remarkably from female in both structure and color; eyes distinctly convergent below; face two-thirds as long as broad; malar space very short; abdomen very slender, postpetiole only a little broader than petiole, tergite 2 fully three times as long as basal width, its sides weakly divergent; tergite 3 much longer than broad; hind coxa and trochanter ventrally whitish; abdomen with a median pattern of reddish involving apex of tergite 1, apex or entire length of tergite 2, and entire lengths of 3 and 4, and broadening at apices of tergites 2–4 to embrace nearly or quite the entire width of the tergites, tergites 3–4 sometimes entirely reddish.

*Host*.—*Neodiprion tsugae* Middleton (probably secondary).

*Type locality*.—Sweet Home, Oreg.

*Holotype, allotype, and paratypes*.—U.S.N.M. No. 53347,

*Paratypes*.—Canadian National Collection; California Academy of Sciences.

Twenty-four females and 7 males, two of the females reared at the type locality by R. L. Furniss, September 16–17, 1935, under Hopk. no. 31660Q; the rest, including the holotype female and allotype male, reared from host cocoons from the same locality, at the Northeastern Forest Insect Laboratory, under no. 51–201–36–2 in Oct. 1936 and May and June 1937.

The antigeny in this species is very unusual—so far as the observation of the author goes, unique—for the genus. Also unusual is the frequent lack, especially in the male, of the second intercubital vein, resulting in an open areolet.

#### *Delomerista diprionis*, n. sp.

A stouter species than *novita* (Cresson), with the thorax nearly two-thirds as deep as long, the propodeal areola fully as broad as long, and the abdomen broader, with the second tergite not longer than its basal width. In *novita* the thorax is nearly twice as long as deep, the areola longer than broad,



and the second tergite longer than the basal width. In *diprionis* the ovipositor sheath is hardly half as long as the abdomen and the apex of the ovipositor is very bluntly pointed, whereas in *novita* the sheath is distinctly more than half as long as the abdomen and the ovipositor is acute at the apex.

*Female*.—(Holotype) Length 10 mm, antenna 8 mm, ovipositor sheath 3 mm.

Head polished, sparsely and weakly punctate, except on face, which is coarsely punctate and mat, in dorsal view with temples convexly receding, about two-thirds as long as short diameter of eye; face medially strongly convex; clypeus about twice as broad as medially long; malar space nearly half as long as basal width of mandible.

Thorax stout, nearly two-thirds as deep as long, polished, sparsely and minutely punctate; propodeum short, posterior face longer than dorsal face, basal lateral areas and areola polished and at most sparsely punctate, posterior face finely coriaceous and mat, other areas more coarsely punctate.

Legs stout, hind coxa a little longer than deep, femur about four times as long as deep, tibia distinctly shorter than combined lengths of femur and trochanter.

Abdomen minutely ruguloso-coriaceous, mat, first tergite more roughly sculptured; broad, second tergite as broad at base as long; ovipositor sheath barely half as long as abdomen; ovipositor in profile bluntly pointed.

Color, as in *novita*, black, with mandibles, malar space, palpi, humeral angle of pronotum, tegulae, radices of wings, and membranous margins of tergites 5-7 whitish; clypeus and occasionally facial orbits piceous; legs ferruginous; apex of front coxa, trochanter and femur anteriorly and apically, middle trochanter and femur apically, front and middle tibiae, except a basally incomplete piceous streak on the extensor surface of each, hind tibia at base and usually more or less below, and a narrow basal annulus on basitarsus whitish; front coxa piceous; front and middle tarsi fuscous; hind femur at apex, and hind tibia and tarsus except white markings, black; wings hyaline, venation black, stigma with a small white spot at base; apex of ovipositor sheath reddish.

*Male*.—Except for smaller size, more slender build, and shorter malar space, differs from female largely in greater extent of white, this including face, underside of scape, clypeus, entire front and middle coxae and trochanters and hind trochanter, and front and middle femora except posteriorly.

*Host*.—Various species of *Diprion* and *Neodiprion*.

*Type locality*.—Oakville, Ontario.

*Holotype, allotype, and paratypes*.—U.S.N.M. no. 19180.

*Paratypes*.—Canadian National Collection; Boston Society of Natural History; Connecticut Agricultural Experiment Station; Entomological Laboratory, Maine Forest Service, Augusta, Maine; California Academy of Sciences.

Described from 38 females and 27 males selected from several series reared from various species of the sawfly genera *Diprion* and *Neodiprion* and a few collected specimens as follows: 9 ♀ and 4 ♂, Oakville, Ontario, reared, evidently indoors, January 1-19, 1934, from *Diprion simile* (Hartig), including holotype and allotype: 3 ♀ and 6 ♂, New Haven, Conn., reared

April 29–May 21 from *D. simile* by M. P. Zappe; 1 ♀, Dublin, N. H., reared (indoors) January 15, 1938, from *D. polytonum* (Hartig) under N. E. Forest Insect Laboratory no. 11.203–37–22; 5 ♀ and 10 ♂, Sweet Home, Oreg., under N. E. For. Ins. Lab. no. 51–201, April 14–June 21, 1936, from *Neodiprion tsugae* Middleton; 4 ♀ and 3 ♂, Sweet Home, Oreg., June 29–July 19, 1935, also from *Neodiprion tsugae* Middleton, under Hopk. no. 31607 P; 2 ♀ and 1 ♂ from the same host, Queen Charlotte Island, British Columbia, April 6, 1931, and March 21 and April 26, 1932, G. R. Hopping; 8 ♀ and 2 ♂, Lincoln, Maine, May 26–June 5, 1932, from *Neodiprion* sp. on *Pinus rigida* and *Pinus resinosa*; 1 ♀, Mont. Laurier, Quebec, December 6, 1929, *Neodiprion* sp. on *Pinus banksiana*, M. Dunn; 1 ♀, Pictured Rocks, Munising, Mich., August 2, 1936, C. W. Sabrosky; 3 ♀, Cranmoor, Wis., June 25, 1910, C. W. Hooker; 1 ♀, Pullman, Wash., August 11, 1896, C. V. Piper; 1 ♂, Moscow, Idaho, May 30, 1912, J. M. Aldrich.

There is considerable variation in size, partly associated with size of the host, specimens from *Diprion simile* averaging largest and those from *Neodiprion tsugae* smallest, females ranging in length from 5 to 11 mm, and males from 6 to 10 mm. The comparative width of the abdomen, especially in the female, and the strength of the propodeal carinae also exhibit considerable variation.

#### Genus *Lamachus* Foerster

To this genus are here assigned those species, otherwise very close to *Mesoleius* both morphologically and biologically, that possess the alar areolet and have the clypeus without a median elevation, but nearly flat, at most shallowly emarginate apically and with a narrow reflexed margin. All the species here treated differ from the genotype, *lophyrorum* (Hartig), by having the speculum more or less polished. Like the genotype, all are parasitic in larvae of sawflies of the subfamily Diprioninae.

The following North American species are referable to the genus as here limited:

#### *Lamachus lophyri* (Ashmead), n. comb.

*Neoeryma lophyri* Ashmead, Proc. Ent. Soc. Washington 4: 169. 1897.

#### *Lamachus virginianus* (Rohwer), n. comb.

*Lagarotis virginianus* Rohwer, Proc. U. S. Nat. Mus. 49: 218. 1915.

#### *Lamachus ruficornis* (Cushman), n. comb.

*Labrossyta ruficoxalis* Cushman, Proc. Ent. Soc. Washington 21: 118. 1919.

#### *Lamachus contortionis* Davis

*Lamachus ? contortionis* Davis, Trans. Amer. Ent. Soc. 24: 284. 1897.

*Lagarotis diprioni* Rohwer, Proc. U. S. Nat. Mus. 49: 215. 1915. New synonymy.

**Lamachus tsugae**, n. sp.

A black species with unusually few and small pale markings.

*Female*.—Length (holotype) 6 mm, antenna 5.5 mm.

Head mat, alutaceous, only temples shining; temples strongly convex; postocellar line little longer than ocellocular line and hardly a half longer than diameter of an ocellus; face sparsely and finely punctate, nearly as broad as eye is long; eyes parallel, very faintly emarginate opposite antennae; clypeus fully half as long as interfoveal line; malar space much less than half as long as basal width of mandible; antenna 35-jointed.

Thorax stout, hardly a half longer than deep, finely alutaceous and sparsely punctate laterally and ventrally, subpolished and sparsely punctate dorsally, speculum polished; notaulices shallow but distinct to a flattened area on disk of mesoscutum; propodeum finely alutaceous, shining basally, mat apically, with faintly indicated lateral carinae, but without median and apical carinae; legs rather slender, hind femur nearly six times as long as deep.

Abdomen stout, tergite 1 distinctly broader at apex than distance from spiracle to apex and more than half as broad basally as apically, tergite 2 broader at base than long; abdomen alutaceous, mat, impunctate, compressed at apex.

Black, with the following markings yellow: Triangular spots in lower facial orbits and occasionally more or less of middle area of face, clypeus, cheeks narrowly, mouthparts, collar narrowly and more or less of lower anterior margin and humeral angle of pronotum, sometimes small spots at origins of notaulices, usually very narrow margins of tergites, and ventral plica; antenna black, faintly reddish below; scutellum and postscutellum sometimes piceous and rarely yellowish medially; legs ferruginous, front and middle coxae and trochanters usually more or less stramineous anteriorly, hind knee, apical third or more of tibia, and entire tarsus black, tibia basally white; wings hyaline, venation black, stigma slightly paler.

*Male*.—More slender than female but otherwise very similar structurally; face yellow for its entire width and nearly up to antennal foramina, upper margin of yellow made uneven by three points of black extending into it from above; prepectus medially yellow and sometimes one or more streaks of yellow extend backward from it on sternum and lower part of pleurum.

*Host*.—*Neodiprion tsugae* Middleton.

*Type locality*.—Sweet Home, Oreg.

*Holotype*, *allotype*, and *paratypes*.—U.S.N.M. no. 53348.

*Paratypes*.—Canadian National Collection; California Academy of Sciences.

Described from 19 females and 7 males, all from cocoons of the host collected by R. L. Furniss at the type locality but mostly reared at the Northeastern Forest Insect Laboratory under no. 51.201.36.2. A few were reared by the collector under Hopkins U. S. no. 31607T.

**Lamachus oregon**, n. sp.

Similar to *ruficoxalis* (Cushman), but with entire face, broad frontal orbits, mesosternum largely, and front and middle coxae and trochanters yellow.

*Female*.—Length 7.0 mm, antennae (broken).

Head alutaceous, mat, temples somewhat shining, moderately convex and receding; postocellar line and diameter of an ocellus equal, slightly shorter than ocellocular line; face medially sparsely punctate, hardly as broad as eye is long; eyes parallel, faintly emarginate; clypeus half as long as interfoveal line; malar space nearly half as long as basal width of mandible.

Thorax hardly a half longer than deep, finely alutaceous and weakly shining laterally, polished dorsally, speculum polished, mesoscutum very finely, pleura more coarsely, punctate; notaulices faint; propodeum finely, granularly mat medially and apically, basal lateral areas somewhat shining and shallowly punctate; only lateral carinae distinct; legs moderately stout, hind femur less than six times as long as deep.

Abdomen rather slender; first tergite less than half as broad basally as apically and hardly broader at apex than distance from spiracles to apex, with a median sulcus on postpetiole flanked by prominent, posteriorly divergent ridges; tergite 2 hardly as broad at base as long; abdomen alutaceous and almost mat, impunctate, compressed apically.

Head and thorax black and yellow, abdomen and legs largely ferruginous; yellow are the face, broad frontal orbits, cheeks and malar space, clypeus, mandibles, palpi, underside of scape and pedicel, anterior margin and humeral angles of pronotum, large cuneiform spots on mesoscutum, scutellum largely, postscutellum, tegulae, subalar tubercles, posterior margin of prepectus, mesosternum largely, mesometapleural suture, front and middle coxae and trochanters and the extensor surfaces of their tibiae, basal half of hind tibia, and ventral plica including hypopygium; tergite 1 black, with broad apical margin extending laterally to include spiracles ferruginous, median carinae near base yellowish; apical half of hind tibia and its tarsus black; flagellum black above, reddish below; wings hyaline, venation black.

*Male*.—Similar to female, but malar space shorter, postocellar line longer than ocellocular line or than diameter of ocellus, the latter two equal, abdomen more slender; yellow markings, especially on thorax, more extensive, with pronotum largely, mesosternum, prepectus and lower half or more of mesopleuron, metapleuron largely, and sometimes part of pleural area of propodeum yellow; mesoscutal markings frequently extending backward along notaulices and meeting on disk; black of thorax and abdomen frequently more or less, and sometimes entirely, replaced by ferruginous. Antenna with 35–36 joints.

*Host*.—*Neodiprion tsugae* Middleton.

*Type locality*.—Sweet Home, Oreg.

*Holotype*, *allotype*, and *paratypes*.—U.S.N.M. no. 53349.

*Paratypes*.—Canadian National Collection; California Academy of Sciences.

One female and 16 males, all reared at the Northeastern Forest Insect Laboratory from cocoons of the host collected at the type locality, under nos. 51.201.36.2 (June 14, 1937) and 51.201.35 (June 17, 1936). The holotype female and allotype male are selected from the first-mentioned series.

The males vary greatly in color, as stated above, and from 4 to 8 mm in length.